

REMARKS

This amendment and the following remarks are responsive to the Office action mailed October 7, 2004. Claims 1, 2, 10-11, 13-16, 18, 20 and 22 are amended. Claims 9 and 30-35 are cancelled. New claims 36-57 are added. Upon entry of this amendment, claims 1-29 and 36-57 will be pending in this application.

ELECTION

The Office action includes a restriction requirement requiring applicants to elect the claims of Group I (1-29), which are directed to a door installation, or the claims of Group II (30-35), which are directed to a control system for a pneumatic door installation. Confirming the prior oral election, applicants elect the claims of Group I (claims 1-29) without traverse. Applicants expressly reserve the right to prosecute claims 30-35 in a divisional application.

Applicants concede the inventions are distinct because the door installation of Group I does not require the control system of Group II and the control system of Group II does not require the door installation of Group I. In response to the rationale set forth in the Office action, applicants note that all the claims of Group I positively recite a pneumatic actuator as part of the invention.

GENERAL CONSIDERATIONS

Doors used in mines are subject to large forces due, at least in part, to air pressure differentials on opposite sides of the door resulting from air flow within the mine. Mine door leafs of substantial weight (e.g., about two thousand pounds)

may be required to withstand the several thousand pounds of peak air loading on door leafs in some mine passageways. Because of the weight of the door leafs and the air loading on them, powerful hydraulic or pneumatic actuators are commonly used to open and close mine doors. Pneumatic actuators offer certain advantages over hydraulic actuators. For example, pneumatic actuators can be powered by compressed air that is typically already available in the mine for other applications. However, a pneumatic actuator can cause a door leaf to runaway (i.e., suddenly and perhaps unexpectedly accelerate to a high speed) if the resistance to movement of the door leaf is suddenly decreased (e.g., when pressure on opposite sides of the door leaf equalizes after the door is cracked open or when an obstruction in the path of the door leaf is overcome). Runaway door leafs can damage property and risk the safety of people in the vicinity of the door.

The present invention is directed to a pneumatically-powered mine door installation having a hydraulic checking system to counter runaway door leafs. The installation comprises a pneumatic actuator that powers movement of a door leaf back and forth between its open and closed positions. The installation also comprises a hydraulic checking system. The hydraulic checking system does not drive movement of the door leaf. Instead, it limits acceleration of the door leaf by the pneumatic actuator, thereby enabling use of pneumatically-powered mine door installations without fear of runaway door leafs. Applicants believe they are the first to use a hydraulic checking system to counter the problem of runaway door leafs associated with pneumatically-powered mine door installations.

RESPONSE TO REJECTIONS UNDER 35 U.S.C. §112

In claims 1 and 20 applicants recite that a mine door frame is "installed in a mine passageway." This phrase is used to define a characteristic of the mine door frame of the claimed invention. It will be noted in this regard that applicants are not claiming the mine passageway per se, only that the door frame is installed in a mine passageway. Section 112 does not prohibit reference to the environment to define a positively recited element of a claim. See Orthokinetics, Inc. v. Safety Travel Chairs, Inc., 1 U.S.P.Q.2d 1081 (Fed. Cir. 1986). In the present case one having ordinary skill in the art can readily understand the scope of claims 1 and 20 when they are read in light of the specification. Therefore, claims 1 and 20 comply with §112, second paragraph.

Applicants acknowledge and appreciate the indication that claims 1 and 20 are directed to allowable subject matter, subject only to the §112 rejections. Contrary to the suggestion in the Office action, however, applicants do not believe any particular structure or configuration of hydraulic checking system is required for patentability of claims 1 and 20. Applicants believe they are the first to use a hydraulic checking system of any kind to control the speed of mine door leaf movement to alleviate the problem of runaway door leafs associated with pneumatic mine doors. Furthermore, all elements recited in amended claims 1 and 20 are functionally and/or structurally integrated. See MPEP 2173.05(g). Thus, one skilled in the art can readily understand the boundaries of the claims.

Claims 1 and 20 are amended by deletion of the phrase "back and forth", which is not necessary to define the invention.

Claim 2 as amended more particularly describes one embodiment of the invention, including recitation of the connection of the hydraulic checking system to the door leaf and a hydraulic checking system anchor. The connections recited in amended claim 2 generally correspond to the connections recited in claim 21 except for the notable difference that claim 21 requires the door installation to be a double-leaf embodiment.

Claim 9 has been cancelled because it is substantially cumulative with amended claim 2. Amended claims 10, 11, and 13-16 now depend from claim 2 rather than claim 9.

Claim 18 has been amended to track the antecedent basis provided in base claim 1.

Claim 22 is amended to correct a typographical error.

New claim 36, which depends from claim 1, is added to more particularly describe one embodiment of the door installation in which the hydraulic checking system is operable to control the speed of the door leaf as it opens and as it closes. New claim 37 is similar to claim 36 except that it depends from claim 20 and therefore is directed to a door installation having first and second door leafs.

New Claims Directed to Door Assembly

New claims 38-57 are directed to various embodiments of a door assembly comprising structural elements that were indicated as being patentable in the Office action. These claims do not specify that the door assembly is installed in a

mine passageway, or that the use of the assembly is limited to any particular environment.

New independent claim 38 recites structure similar in scope to the structure recited in claim 10, including base claims 1 and 2. Claims 39-45 depend from claim 38. Claim 39 is analogous to claim 4. Claims 40-43 are analogous to claims 12-15. Claim 44 is analogous to claim 17. Claim 45 is analogous to claim 36.

New independent claim 46 recites structure similar in scope to the structure recited in claim 21, including the structure recited in claim 20, plus the additional limitation that the rods of the hydraulic checking system have shorter stroke than the pneumatic actuators, which is analogous to claim 10. Claims 47-52 depend from claim 46. Claim 47 is analogous to claim 22. Claim 48 is analogous to claim 24. Claims 49-50 are analogous to claims 26-27. Claim 51 is analogous to claim 29. Claim 52 is analogous to claim 37.

New independent claim 53 recites structure similar in scope to the structure recited in claim 2, including the structure recited in base claim 1, plus additional structure that is analogous to the sum of claims 13 and 18. Claim 54 is analogous to claim 4. Claim 55 is analogous to claim 14. Claim 56 is analogous to claim 15. Claim 57 is analogous to claim 17.

Amendments to the Specification

The title and field of invention have been amended to reflect that fact that claims directed to a door assembly are being presented herein.

CONCLUSION

In view of the foregoing, allowance of the application is respectfully requested. Applicants request a telephone interview with the Examiner if this would expedite allowance of the application.

A check in the amount of \$635 is enclosed to cover the additional claim fees and a one-month extension of time to reply to the Office action. The Commissioner is hereby authorized to charge any deficiency in fees required by this amendment or credit any overpayment to Deposit Account No. 19-1345.

Respectfully submitted,

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